

SECTION II—CLAIMS

1.-44. (Canceled)

45. (New) A system, comprising:

a holographic optical element (HOE) device having:

a first element having first and second surfaces, the first surface being positionable to face incident light rays,

an emulsion material disposed over the second surface of the first element and having a recorded interference pattern thereon, and

a second element having a first surface disposed over the emulsion material, the second element being structured to pass resulting light rays, derived from the incident light rays diffracted by the recorded interference pattern, in a direction towards a location facing a second surface of the second element;

an optical processing unit to receive the resulting light rays passed by the second element;

a collimating optical assembly positionable between the HOE device and the optical processing unit to collimate the resulting light rays; and

an optical element positionable between the collimating optical assembly and the optical processing unit to separate, from the collimated resulting light rays, a tracking channel and a communication channel, and to direct the communication channel towards the optical processing unit.

46. (New) The system of claim 45 wherein the collimating optical assembly includes a movable refocusing element to longitudinally refocus the collimated resulting light rays.

47. (New) The system of claim 46 wherein the refocusing element is movable via motor control.

48. (New) The system of claim 45 wherein the collimating optical assembly includes a plurality of lenses to correct aberrations in the resulting light rays.

49. (New) The system of claim 45 wherein the optical element comprises a monolithic optical element, the monolithic optical element including:

a lens to refract the resulting light rays;

a first element, coupled to the lens and coupled to a second element at an interface, to receive the refracted light rays from the lens;

a beam splitter disposed at the interface between the first and second element to direct the refracted light rays to the tracking channel and to the communication channel; and

a third element coupled to the second element, the third element having a reflective surface to reflect the refracted light rays of the communication channel towards the optical processing unit.

50. (New) An apparatus, comprising:

a holographic optical element (HOE) device disposed in a receiver unit, the HOE device including a recorded interference pattern, the HOE device being positionable to face incident light rays and being capable of passing the incident light rays as resulting light rays diffracted by the recorded interference pattern;

a collimating optical assembly positionable between the HOE device and an optical processing unit to collimate the resulting light rays; and

a monolithic optical element positionable between the collimating optical assembly and the optical processing unit to separate, from the collimated resulting light rays, a tracking channel and a communication channel, and to direct the communication channel towards an optical processing unit, the monolithic optical element including:

a lens to refract the resulting light rays;

a first element, coupled to the lens and coupled to a second element at an interface, to receive the refracted light rays from the lens;

a beam splitter disposed at the interface between the first and second element to direct the refracted light rays to the tracking channel and to the communication channel; and

a third element coupled to the second element, the third element having a reflective surface to reflect the refracted light rays of the communication channel towards an optical processing unit.